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| FAY SHARPE LLP<br>1228 Euclid Avenue, 5th Floor<br>The Halle Building<br>Cleveland, OH 44115 |             |                      | EXAMINER<br>KASTURE, DNYANESH G |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/580,128 | <b>Applicant(s)</b><br>HOLZEMER ET AL. |  |
|                              | <b>Examiner</b><br>DNYANESH KASTURE  | <b>Art Unit</b><br>3746                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9,12-15,17 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9,12-15,17 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The previously made rejections under section 112 are hereby withdrawn in view of cancellation of claims 10 and 16 and amendments to claim 17.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Patent 6,375,431 B1) in view of Wang (US Patent 6,539,714 B1)

4. In Re Claim 1, with reference to Figures 1 and 4, Ando discloses a positive displacement vacuum pump ("A") comprising a drive motor (143), a way to measure inlet pressure (inherent from pressure measurements at the suction port that generate the data in Figure 7) and a method for controlling a drive motor of the pump that is implied from the following disclosure in Column 7, Lines 16-29: "In the evacuating apparatus of this invention, a driving motor for each of the booster screw vacuum pump

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and the roughing screw vacuum pump is rotated at as high a rotating speed as possible as far as the motor is not overloaded, to shorten the exhaust time, in a range where the suction side pressure of the booster screw vacuum pump is relatively high. When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber, and the rotating speed of the driving motor for the roughing screw vacuum pump is reduced to as low a rotating speed as possible ..”.

- The method of storing a relationship of speed versus inlet pressure is anticipated by the above disclosure because the controller would have to know that for each value of inlet pressure between high (atmospheric) pressure and “a relatively low pressure” the respective motor speed that the motor is driven at is the “as high a rotating speed as possible”. Therefore this information would have to be stored in a manner that can be accessed by the controller. Note that the relationship is a continuous function (related to continuous curve) because the controller would have to know what to do with the speed at every value of inlet pressure above the "relatively low pressure". Note also that Applicant's Figure 2 allows for a “curve” to have straight portions (Above P1 and below P2)
- The above disclosure also anticipates the curve's claimed upper range as follows: in the phrase “a driving motor for the booster screw vacuum pump and the roughing screw vacuum pump is rotated at AS HIGH A ROTATING SPEED AS

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POSSIBLE”; the “as high a rotating speed as possible” corresponds to applicant’s  $n_1$  until the suction side pressure has reached “a relatively low pressure” – which is applicant’s  $P_1$

- The above disclosure also anticipates the curve’s claimed alteration range as follows: the phrase “When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber” implies that for ALL values of inlet pressure below  $P_1$ , the associated corresponding speed value  $n$  is “the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber”. Clearly  $n$  is less than or equal to  $n_1$
- The above disclosure also anticipates determining the inlet pressure, determining the speed corresponding to the inlet pressure and operating the motor at the determined speed, because the inlet pressure would have to be read in order to determine whether the motor should be driven at speed  $n_1$  or  $n$ .

5. Although Ando anticipates storing a relationship of speed versus inlet pressure, Ando does not disclose that the relationship is stored in the form of a curve, followed by the step of determining the speed parameter from the curve.

6. Nevertheless, with reference to the flow chart of Figure 4, and the plot in Figure 3, Wang discloses a method of determining turbocharger (the compressor part of which is a pump) rotational speed ( $TS_E$ ) based on readings from a compressor (pump) inlet pressure (CIP) sensor, with the intermediate step of using a curved surface (Figure 3) to

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determine a parameter (CTS) related to speed from a parameter (PR) related to inlet pressure. Equation (5) in Column 7, Line 9 discloses a polynomial equation for PR for a given value of ES. The pressure ratio PR is related to the inlet pressure CIP. The CTS value corresponding to the CIP is read from the plot and is multiplied by the square root of CIT to determine the speed  $TS_E$ .

7. It would have been obvious to a person having ordinary skill in the art at the time of the invention to store the speed pressure relationship of Ando in the form of a curve as suggested by Wang and to determine a speed from the curve corresponding to an inlet pressure reading for the purpose of automating the system (since an operator would not be needed, the control function would be performed by a microprocessor). It has been held that automating a manual activity which has accomplished the same result involves only routine skill in the art - MPEP 2144.04 (III).

8. In Re Claim 3, with reference to Figures 1 and 4, Ando discloses a positive displacement vacuum pump ("A") comprising a drive motor (143), a way to measure inlet pressure (inherent from pressure measurements at the suction port that generate the data in Figure 7) and a method for controlling a drive motor of the pump that is implied from the following disclosure in Column 7, Lines 16-29: "In the evacuating apparatus of this invention, a driving motor for each of the booster screw vacuum pump and the roughing screw vacuum pump is rotated at as high a rotating speed as possible as far as the motor is not overloaded, to shorten the exhaust time, in a range where the

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suction side pressure of the booster screw vacuum pump is relatively high. When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber, and the rotating speed of the driving motor for the roughing screw vacuum pump is reduced to as low a rotating speed as possible ..”.

- The method of storing a relationship of speed versus inlet pressure is anticipated by the above disclosure because the controller would have to know that for each value of inlet pressure below “a relatively low pressure” the motor speed is “reduced to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber”. Therefore this information would have to be stored in a manner that can be accessed by the controller. Note that the relationship is a continuous function (related to continuous curve) because the controller would have to know what to do with the speed at every value of inlet pressure below the “relatively low pressure”. Note also that Applicant’s Figure 2 allows for a “curve” to have straight portions (Above P1 and below P2)

- The above disclosure also anticipates the curve’s claimed lower range as follows: in the phrase “When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated

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chamber" the "relatively low pressure" reads on applicant's lower limit pressure P2 as claimed, and "the lowest rotating speed to maintain a degree of vacuum required" reads on applicant's single constant lower speed  $n_2$  as claimed

- The above disclosure also anticipates the curve's claimed alteration range as follows: in the phrase "a driving motor for the booster screw vacuum pump and the roughing screw vacuum pump is rotated at AS HIGH A ROTATING SPEED AS POSSIBLE as far as the motor is not overloaded, to shorten the exhaust time, in a range where the suction side pressure of the booster screw vacuum pump IS RELATIVELY HIGH" the "suction side pressure of the booster vacuum pump is relatively high" corresponds to all inlet pressure values larger than P2 where the corresponding speed value  $n$  is "as high a rotating speed as possible". Clearly  $n$  is greater than  $n_2$
- The above disclosure also anticipates determining the inlet pressure, determining the speed corresponding to the inlet pressure and operating the motor at the determined speed, because the inlet pressure would have to be read in order to determine whether the motor should be driven at speed  $n$  or  $n_2$ .

9. Although Ando anticipates storing a relationship of speed versus inlet pressure, Ando does not disclose that the relationship is stored in the form of a curve, followed by the step of determining the speed parameter from the curve.

10. Nevertheless, with reference to the flow chart of Figure 4, and the plot in Figure 3, Wang discloses a method of determining turbocharger (the compressor part of which is a pump) rotational speed ( $TS_E$ ) based on readings from a compressor (pump) inlet



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pressure (CIP) sensor, with the intermediate step of using a curved surface (Figure 3) to determine a parameter (CTS) related to speed from a parameter (PR) related to inlet pressure. Equation (5) in Column 7, Line 9 discloses a polynomial equation for PR for a given value of ES. The pressure ratio PR is related to the inlet pressure CIP. The CTS value corresponding to the CIP is read from the plot and is multiplied by the square root of CIT to determine the speed  $TS_E$ .

11. It would have been obvious to a person having ordinary skill in the art at the time of the invention to store the speed pressure relationship of Ando in the form of a curve as suggested by Wang and to determine a speed from the curve corresponding to an inlet pressure reading for the purpose of automating the system (since an operator would not be needed, the control function would be performed by a microprocessor). It has been held that automating a manual activity which has accomplished the same result involves only routine skill in the art - MPEP 2144.04 (III).

12. In Re Claims 8 and 14, Figure 3 of Wang is clearly a diagram that is characteristic of a relationship between parameters related to speed and pressure.

13. In Re Claim 13, the positive displacement pump ("A") of Ando is arranged upstream of high vacuum pump ("B") as seen in Figure 1, and suction port (110a) is on the suction side of the flow path of the high vacuum pump.

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14. Claims 2, 4 - 7, 12, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Patent 6,375,431 B1) in view of Wang (US Patent 6,539,714 B1) and further in view of Bishop et al (PG Pub US 20030206805 A1)

15. In Re Claim 2, with reference to Figures 1 and 4, Ando discloses a positive displacement vacuum pump ("A") comprising a drive motor (143), a way to measure inlet pressure (inherent from pressure measurements at the suction port that generate the data in Figure 7) and a method for controlling a drive motor of the pump that is implied from the following disclosure in Column 7, Lines 16-29: "In the evacuating apparatus of this invention, a driving motor for each of the booster screw vacuum pump and the roughing screw vacuum pump is rotated at as high a rotating speed as possible as far as the motor is not overloaded, to shorten the exhaust time, in a range where the suction side pressure of the booster screw vacuum pump is relatively high. When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber, and the rotating speed of the driving motor for the roughing screw vacuum pump is reduced to as low a rotating speed as possible ..".

- The method of storing a relationship of speed versus inlet pressure is anticipated by the above disclosure because the controller would have to know that for each value of inlet pressure between atmospheric pressure and "a relatively low pressure" the

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respective motor speed that the motor is driven at is the “as high a rotating speed as possible”. Further, the controller would have to know that for each value of inlet pressure below “a relatively low pressure” the motor speed is “reduced to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber”.

Therefore this information would have to be stored in a manner that can be accessed by the controller. Note that the relationship is a continuous function (related to a continuous curve) because the controller would have to know what to do with the speed at EVERY value of inlet pressure above the “relatively low pressure”, and below the “relatively low pressure”. Note also that Applicant’s Figure 2 allows for a “curve” to have straight portions (Above P1 and below P2)

- The above disclosure also anticipates the curve’s claimed upper range as follows: in the phrase “a driving motor for the booster screw vacuum pump and the roughing screw vacuum pump is rotated at AS HIGH A ROTATING SPEED AS POSSIBLE”; the “as high a rotating speed as possible” corresponds to applicant’s  $n_1$  until the suction side pressure has reached “a relatively low pressure” – which is applicant’s P1
- The above disclosure also anticipates the constant speed associated with curve’s claimed lower range as follows: in the phrase “When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber” the “lowest rotating speed to maintain a

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degree of vacuum required” reads on applicant’s single constant lower speed  $n_2$  as claimed

- The above disclosure also anticipates determining the inlet pressure, determining the speed corresponding to the inlet pressure and operating the motor at the determined speed, because the inlet pressure would have to be read in order to determine whether the motor should be driven at speed  $n_1$  or  $n_2$ .

16. However, Ando does not disclose an alteration range for inlet pressures smaller than the upper limit pressure  $P_1$  and larger than the lower limit pressure  $P_2$  (claim language: “alteration range limited to inlet pressure values  $p$  larger than the lower limit pressure  $P_2$ ”), because Ando does not disclose the manner in which “the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber”. In other words, Ando does not disclose the manner in which the speed is reduced from  $n_1$  to  $n_2$ .

17. Nevertheless, Bishop et al discloses a method of controlling a pump motor in Paragraph [0053]: “the invention provides an improved hydraulic pump in which a pumping unit is driven with a variable speed, THE SPEED BEING SET ACCORDING TO THE PRESSURE DEMANDED BY THE LOAD SO AS TO YIELD A RELATIVELY CONSTANT POWER OUTPUT OF THE PUMP in terms of pressure and flow rate.”

18. It would have been obvious to a person having ordinary skill in the art at the time of the invention to reduce the speed of the motor of Ando from  $n_1$  to  $n_2$  in a manner that maintains constant power output of the pump as suggested by Bishop et al for the

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purpose of reducing fatigue/stress on the motor. Note that in the process of reducing the speed from  $n_1$  to  $n_2$ , the motor is still running, therefore the inlet pressure would continue to drop below  $P_1$ . It would be routine skill to generate a set of rules that would operate the motor at an appropriate speed value  $n$  that maintains constant power output of the pump corresponding to the inlet pressure  $p$ , since the vacuum pump power output depends on the pump speed  $n$  and pump inlet pressure  $p$ . The inlet pressure value  $P_2$  as claimed is the inlet pressure that maintains constant power corresponding to speed  $n_2$ . In other words, the power output at speed  $n_1$  and inlet pressure  $p_1$  is equal to the power output at speed  $n_2$  and inlet pressure  $p_2$ . Clearly,  $P_1$  is greater than  $P_2$  as claimed because the inlet pressure continues to drop from the operation of the pump.

19. Although Ando modified by Wang anticipates storing a relationship of speed versus inlet pressure, Ando does not disclose that the relationship is stored in the form of a curve, followed by the step of determining the speed parameter from the curve.

20. Nevertheless, with reference to the flow chart of Figure 4, and the plot in Figure 3, Wang discloses a method of determining turbocharger (the compressor part of which is a pump) rotational speed ( $TS_E$ ) based on readings from a compressor (pump) inlet pressure (CIP) sensor, with the intermediate step of using a curved surface (Figure 3) to determine a parameter (CTS) related to speed from a parameter (PR) related to inlet pressure. Equation (5) in Column 7, Line 9 discloses a polynomial equation for PR for a given value of ES. The pressure ratio PR is related to the inlet pressure CIP. The CTS value corresponding to the CIP is read from the plot and is multiplied by the square root of CIT to determine the speed  $TS_E$ .

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21. It would have been obvious to a person having ordinary skill in the art at the time of the invention to store the speed pressure relationship of Ando in the form of a curve as suggested by Wang and to determine a speed from the curve corresponding to an inlet pressure reading for the purpose of automating the system (since an operator would not be needed, the control function would be performed by a microprocessor). It has been held that automating a manual activity which has accomplished the same result involves only routine skill in the art - MPEP 2144.04 (III).

22. In Re Claim 4, in accordance with the teachings of Bishop et al, as the inlet pressure decreases, the speed would have to decrease in order to maintain constant power output in the alteration range.

23. In Re Claims 5 and 6, it would have been obvious to a person having ordinary skill in the art to operate the speeds in the claimed ranges at the pressures in the claimed ranges since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art – MPEP 2144.05 (II-A).

24. In Re Claim 7, the positive displacement pump (“A”) of Ando is arranged upstream of high vacuum pump (“B”) as seen in Figure 1, and suction port (110a) is on the suction side of the flow path of the high vacuum pump.

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25. In Re Claim 12, Ando and Bishop et al as applied to Claims 2 and 4 disclose all the claimed limitations.

26. In Re Claim 17, Wang discloses an inlet pressure sensor (Abstract) and a memory (45) that stores the preselected relationship between an inlet pressure related parameter and a speed related parameter. Ando, Wang and Bishop et al as applied to Claim 2 discloses all the claimed limitations.

27. In Re Claim 20, as discussed in Claim 2, the relationship between the inlet pressure and drive speed is a continuous curve (Applicant's Figure 2 allows for a "curve" to have straight portions (Above P1 and below P2).

28. Claims 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (US Patent 6,375,431 B1) in view of Wang (US Patent 6,539,714 B1) and further in view of de-Simon et al (US Patent 5,971,725 A)

29. In Re Claims 9 and 15, Ando and Wang as applied to Claims 1 and 3 respectively disclose all the claimed limitations except for the drive motor being an asynchronous motor.

30. Nevertheless, de-Simon et al discloses in Column 5, Lines 24-25 that a vacuum pumping device incorporates a 3 phase AC asynchronous motor.

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31. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use an asynchronous motor as taught by de-Simon et al to drive the pump of Ando due to its self starting ability and ease of operation.

### ***Response to Arguments***

32. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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/Devon C Kramer/  
Supervisory Patent Examiner, Art  
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DGK